

U.S. Appln. No. 10/789,663
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AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF CLAIMS:

1. (Canceled)
2. (Currently Amended) The method of Claim [[1]] 32 wherein at least one of the ~~first analysis zone and second~~ analysis zones comprise one or more of gas chromatography, liquid chromatography, flame ionization detection, flame emission detection, thermal conductivity detection, election capture detection, infrared absorption spectroscopy, Raman spectroscopy, ultraviolet absorption spectroscopy, visible absorption spectroscopy, fluorescence spectroscopy, infrared thermography, nuclear magnetic resonance, emission spectroscopy, and mass spectrometry, as well as other radiochemical methods, electroanalytical methods, potentiometric methods, conductometric methods, electrogravimetric methods, coulometric methods, voltammetry and combinations thereof.
3. (Currently Amended) The method of Claim [[2]] 32 wherein at least one of the ~~first analysis zone and second~~ analysis zones comprise gas chromatography plus one or more of [[of]] flame ionization detection, flame emission detection, thermal conductivity detection, pulse discharge detection and election capture detection.
4. (Canceled)
5. (Canceled)
6. (Canceled)

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7. (Currently Amended) The method of Claim ~~[[4]]~~ 32 wherein at least one of the fractionation conditions comprise isothermal conditions.
8. (Currently Amended) The method of Claim 7 wherein at least one ~~or both of the first and second~~ analysis conditions comprise isothermal conditions.
9. (Canceled)
10. (Currently Amended) The method of Claim ~~[[9]]~~ 32 further comprising between two and ten sequential fractionation and analysis zones.
11. (Canceled)
12. (Currently Amended) The method of Claim ~~[[11]]~~ 33 further comprising between two and 100 sequential fractionation and analysis zones.
13. (Canceled)
14. (Canceled)
15. (Currently Amended) The method of Claim ~~[[14]]~~ 34 wherein at least one of the ~~first analysis zone and second~~ analysis zones comprise one or more of gas chromatography, flame ionization detection, flame emission detection, thermal conductivity detection, pulse discharge detection and election capture detection.
16. (Currently Amended) The method of Claim ~~[[13]]~~ 34 wherein the fractionation conditions comprise isothermal conditions.
17. (Currently Amended) The method of Claim 16 wherein ~~one or both of the first and second~~ at least one of the analysis conditions comprise isothermal conditions.
18. (Canceled)
19. (Currently Amended) The method of Claim ~~[[18]]~~ 34 further comprising between two and ten sequential fractionation and analysis zones.

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20. (Original) A method of expediting the analysis of a sample containing at least one relevant low-boiling component and at least one relevant high-boiling component comprising:

- a) fractionating the sample in a fractionation zone comprising gas chromatography at fractionation conditions to obtain a low-boiling fraction as eluate containing the at least one relevant low-boiling component and a high-boiling fraction through backflushing containing the at least one relevant high-boiling component;
- b) fractionating the low-boiling component in a sequential fractionation zone which separates the low-boiling fraction at sequential fractionation conditions to obtain a lower-boiling fraction containing the at least one relevant low-boiling component and an intermediate fraction containing at least one relevant intermediate component;
- c) analyzing the lower-boiling fraction in a first analysis zone comprising gas chromatography at first analysis conditions to determine one or both of the presence and concentration of at least one relevant low-boiling component; and,
- d) analyzing the high-boiling fraction in a second analysis zone at second analysis conditions to determine one or both of the presence and concentration of at least one relevant high-boiling component.

21. (Original) The method of Claim 20 wherein the second analysis zone comprises gas chromatography.

22. (Original) The method of Claim 20 wherein at least one of the first analysis zone and second analysis zone comprise one or more of flame ionization detection, flame emission detection, thermal conductivity detection, pulse discharge detection, electron capture detection, infrared absorption spectroscopy, Raman spectroscopy, distillation measurement, nuclear magnetic resonance, and mass spectrometry.

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23. (Original) The method of Claim 20 wherein the fractionation conditions, the sequential fractionation conditions and the first analysis conditions comprise isothermal conditions.
24. (Original) The method of Claim 23 wherein the fractionation conditions comprise a higher temperature than that of the sequential fractionation conditions, and the sequential fractionation conditions comprise a higher temperature than that of the first analysis conditions.
25. (Canceled)
26. (Canceled)
27. (Currently Amended) The method of Claim ~~[[25]]~~ 35 wherein at least one of the ~~first analysis zone and second analysis zones~~ comprise one or more of gas chromatography, flame ionization detection, flame emission detection, thermal conductivity detection, pulse discharge detection, election capture detection, infrared absorption spectroscopy, Raman spectroscopy, distillation measurement, nuclear magnetic resonance, and mass spectrometry.
28. (Currently Amended) The method of Claim ~~[[25]]~~ 35 wherein at least one of the fractionation conditions comprise isothermal conditions.
29. (Currently Amended) The method of Claim ~~[[25]]~~ 35 wherein ~~one or both of the first and second~~ at least one of the analysis conditions comprise isothermal conditions.
30. (Currently Amended) The method of Claim ~~[[25]]~~ 35 further comprising reacting a plurality of feedstocks at reaction conditions in a reaction zone comprising an array of reactors to obtain ~~[[a]]~~ the plurality of samples, and directing the samples to a sampling valve to sequence the samples.
31. (Canceled)

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32. (New) A method of expediting the analysis of a sample containing at least one

relevant low-boiling component and at least one relevant high-boiling component

comprising:

a) fractionating the sample in a fractionation zone comprising gas chromatography at fractionation conditions to obtain a low-boiling fraction as eluate containing the at least one relevant low-boiling component and a high-boiling fraction through backflushing containing the at least one relevant high-boiling component;

b) fractionating the low-boiling fraction in a sequential fractionation zone to separate the low-boiling fraction at sequential fractionation conditions to obtain a lower-boiling fraction containing the at least one relevant low-boiling component and an intermediate fraction containing at least one relevant intermediate component;

c) analyzing the lower-boiling and intermediate fractions in sequential analysis zones wherein at least one analysis zone comprises gas chromatography to determine one or both of the presence and concentration of at least one relevant lower-boiling and intermediate components; and,

d) analyzing the high-boiling fraction in a high-boiling fraction analysis zone at analysis conditions to determine one or both of the presence and concentration of at least one relevant high-boiling component.

33. (New) A method of expediting the analysis of a sample containing at least one

relevant low-boiling component and at least one relevant high-boiling component

comprising:

a) fractionating the sample in a fractionation zone comprising gas chromatography at fractionation conditions to obtain a low-boiling fraction as eluate containing the at least

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one relevant low-boiling component and a high-boiling fraction through backflushing

containing the at least one relevant high-boiling component;

- b) fractionating the high-boiling fraction in a sequential fractionation zone which separates the high-boiling fraction at sequential fractionation conditions to obtain a higher-boiling fraction containing at least one relevant high-boiling component and an intermediate fraction containing at least one relevant intermediate component;
- c) analyzing the low-boiling fraction in a first analysis zone comprising gas chromatography at first analysis conditions to determine one or both of the presence and concentration of at least one relevant low-boiling component; and,
- d) analyzing the higher-boiling and intermediate fractions in a sequential analysis zone to determine one or both of the presence and concentration of at least one relevant higher-boiling and intermediate components.

34. (New) A method of expediting the analysis of a sample containing at least one relevant low-boiling component and at least one relevant high-boiling component comprising:

- a) fractionating the sample in a fractionation zone comprising gas chromatography at fractionation conditions to obtain a low-boiling fraction as eluate containing the at least one relevant low-boiling component and a high-boiling fraction through backflushing containing the at least one relevant high-boiling component;
- b) fractionating the high-boiling fraction in a sequential fractionation zone to separate the high-boiling fraction at sequential fractionation conditions to obtain a higher-boiling fraction containing at least one relevant high-boiling component and an intermediate fraction containing at least one relevant intermediate component;

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c) analyzing the low-boiling fraction in a first analysis zone at first analysis

conditions to determine one or both of the presence and concentration of at least one relevant low-boiling component; and,

d) analyzing the higher-boiling and intermediate fractions in sequential analysis zones wherein at least one analysis zone comprises gas chromatography to determine one or both of the presence and concentration of respective relevant high-boiling and intermediate components.

35. (New) A method of expediting the analysis of a plurality of samples containing at least one relevant low-boiling component and at least one relevant high-boiling component comprising:

a) fractionating the plurality of samples in a fractionation zone comprising gas chromatography at fractionation conditions to obtain a plurality of low-boiling fractions as eluate containing the at least one relevant low-boiling component and a plurality of high-boiling fractions as backflush containing the at least one relevant high-boiling component;

b) fractionating the plurality of low-boiling fractions in a sequential fractionation zone to separate the low-boiling fractions at sequential fractionation conditions to obtain a plurality of lower-boiling fractions containing the at least one relevant low-boiling component and a plurality of intermediate fractions containing at least one relevant intermediate component;

c) analyzing the plurality of lower-boiling and intermediate fractions sequentially in sequential analysis zones to determine one or both of the presence and concentration of at least one relevant lower-boiling and intermediate components; and,

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d) analyzing the plurality of high-boiling fractions sequentially in a high-boiling

fraction analysis zone at second analysis conditions to determine one or both of the presence and concentration of at least one relevant high-boiling component.

36. (New) A method of expediting the analysis of a plurality of samples containing at least one relevant low-boiling component and at least one relevant high-boiling component comprising:

a) fractionating the plurality of samples in a fractionation zone comprising gas chromatography at fractionation conditions to obtain a plurality of low-boiling fractions as eluate containing the at least one relevant low-boiling component and a plurality of high-boiling fractions as backflush containing the at least one relevant high-boiling component;

b) fractionating the plurality of high-boiling fractions in a sequential fractionation zone which separates the high-boiling fractions at sequential fractionation conditions to obtain a plurality of higher-boiling fractions containing at least one relevant high-boiling component and a plurality of intermediate fractions containing at least one relevant intermediate component;

c) analyzing the plurality of low-boiling fractions sequentially in a first analysis zone comprising gas chromatography at first analysis conditions to determine one or both of the presence and concentration of at least one relevant low-boiling component; and,

d) analyzing the plurality of higher-boiling and intermediate fractions in a sequential analysis zone to determine one or both of the presence and concentration of at least one relevant higher-boiling and intermediate components.

37. (New) The method of Claim 36 wherein at least one of the analysis zones comprise one or more of gas chromatography, flame ionization detection, flame emission

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detection, thermal conductivity detection, pulse discharge detection, election capture

detection, infrared absorption spectroscopy, Raman spectroscopy, distillation

measurement, nuclear magnetic resonance, and mass spectrometry.

38. (New) The method of Claim 36 wherein at least one of the fractionation conditions comprise isothermal conditions and at least one of the analysis conditions comprise isothermal conditions.

39. (New) The method of Claim 36 further comprising reacting a plurality of feedstocks at reaction conditions in a reaction zone comprising an array of reactors to obtain the plurality of samples and directing the sample to a sampling valve to sequence the samples.

40. (New) The method of Claim 33 wherein at least one of the analysis zones comprise one or more of gas chromatography, liquid chromatography, flame ionization detection, flame emission detection, thermal conductivity detection, election capture detection, infrared absorption spectroscopy, Raman spectroscopy, ultraviolet absorption spectroscopy, visible absorption spectroscopy, fluorescence spectroscopy, infrared thermography, nuclear magnetic resonance, emission spectroscopy, and mass spectrometry, as well as other radiochemical methods, electroanalytical methods, potentiometric methods, conductometric methods, electrogravimetric methods, coulometric methods, voltammetry and combinations thereof.

41. (New) The method of Claim 33 wherein at least one of the fractionation conditions comprise isothermal conditions and at least one of the analysis conditions comprise isothermal conditions.